PROCEEDINGS OF THE

ENTOMOLOGICAL SOCIETY OF WASHINGTON

VOL. 41 DECEMBER 1939 No. 9

THE SPECIFIC IDENTITY OF THE AMERICAN DATE MITE; DESCRIPTION OF TWO NEW SPECIES OF PARATETRANYCHUS.

By E. A. McGregor,

Bureau of Entomology and Plant Quarantine, U. S. Department of Agriculture.

In 1914 Banks[1] described a mite occurring on the date palm at El Centro in the Imperial Valley of California. He gave it the name *Tetranychus simplex*. As a result of a study of Bank's type slides, the writer[2] in 1919 synonymized *T. simplex* Banks with *T. viridis* Banks, the latter, from pecan in Texas, having been described in 1894.[3] No males were present on Banks' slides of these two species, and no female anatomical differences could be found to separate them. At the same time the writer transferred *viridis* to *Paratetranychus*, a genus created in 1910 by Zacher to include tetranychids with complex tarsal claws.

In 1922 a mite referred to Ewing from dates in the Coachella Valley, Calif., was considered by him to be distinct from *Paratetranychus viridis* Banks, and was described by him as *P. heteronychus*.[4]

In July, 1921, the late F. S. Stickney, of the Bureau of Entomology and Plant Quarantine, United States Department of Agriculture, commenced a study of the mite attacking cultivated dates, and this project was continued, with interruptions, until late in 1934. In the final report on his studies Dr. Stickney desired to have established the specific identity of the mites attacking the date and other palms, as well as various grasses in the Coachella and Imperial Valleys. As one phase of this study he desired to know whether or not the mite attacking dates in the Imperial Valley is distinct from the date mite at Indio. Early in 1933 the writer undertook a study of the anatomy and distribution of the mites attacking dates.

At the time when Banks described *viridis* and *simplex*, the male genital characters of mites were not being employed.

[1] Pomona Col. Jour. Ent. and Zool., vol. 6, 1914, p. 57.

[2] U. S. Natl. Mus. Proc., vol. 56, 1919, p. 641.

[3] Amer. Ent. Soc. Trans., vol. 21, 1894, p. 218.

[4] Ent. Soc. Wash. Proc., vol. 24, 1922, p. 104.

Through the kindness of C. B. Nickels, in charge of the Bureau of Entomology and Plant Quarantine station at Brownwood, Tex., specimens of both sexes of a mite from pecan foliage in Texas were recently sent to the writer, who has made a comparative study of Banks' *simplex* and the pecan mite. The females of the latter mite appeared to be identical with those of *viridis*, based on Banks' description and the study of the type specimens, but the male pecan mite (Plate 29, fig. 10) was found to be distinct from the mite of dates (Plate 29, figs. 4 and 5). This demonstrates that the present writer was in error in reducing *Paratetranychus simplex* to synonymy with *P. viridis*, and he herewith restores Banks' *simplex* to valid specific status.

Since a mite, assumed to be the date mite, was known by Dr. Stickney to infest certain grasses, it became necessary to devote some attention to the mites occurring on various monocotyledons. In the course of this work mites were collected by Dr. Stickney and the writer from date and other palms, grasses, bamboo, etc., from many localities in eight counties of southern California, and two counties of Arizona. These studies of distribution and anatomy have been completed, and the data that follow constitute a report on the findings.

ONLY ONE SPECIES ON DATES.

In the course of these studies mites were microscopically examined from 57 distinct collections from date fruits and foliage. The localities were distributed throughout the Coachella and Imperial Valleys. Especial efforts were made to have in these collections ample material from the type localities of both *Paratetranychus simplex* Banks and *P. heteronychus* Ewing. H. W. Gray and L. C. Cordill, of the Division of Date Palm Scale Control, Bureau of Entomology and Plant Quarantine, sent the writer many collections of mites that had been intercepted in the course of their examination of date palms over a wide area in the Imperial Valley.

The writer attaches much significance to the fact that in all these collections from dates only one species of mite has been represented. The date mites from the Indio district have always proved to be identical with those from or near El Centro. It appears to be sufficiently established that the date mite of the Coachella Valley is the same as the date mite of the Imperial Valley. This is natural, since there are no barriers separating these districts.

Ewing's original description of *Paratetranychus heteronychus* agrees in all particulars with the anatomy of the mite on date at El Centro, which was the type locality of Banks' *P. simplex*. Furthermore, if the microscope equipment that Banks was using in 1914 is taken into consideration, his description of

P. simplex applies equally well to the *P. heteronychus* described by Ewing.

As the writer has shown that Banks' date mite (*Paratetranychus simplex*) is distinct from his pecan mite (*P. viridis*), the resurrection of *simplex* becomes necessary. He has shown that Ewing's *P. heteronychus* is identical with *P. simplex*. Since the name *simplex* has priority over *heteronychus*, the latter is herewith reduced to synonymy.

Bank's original description of *Paratetranychus simplex* was altogether too brief and unspecific to define the species properly. Ewing's description of the synonym, *P. heteronychus*, is given in considerable detail, and should serve most taxonomic needs. However, it seems best to rewrite the description of this species, taking into consideration the diagnoses of both Banks and Ewing as well as the data obtained by the present author.

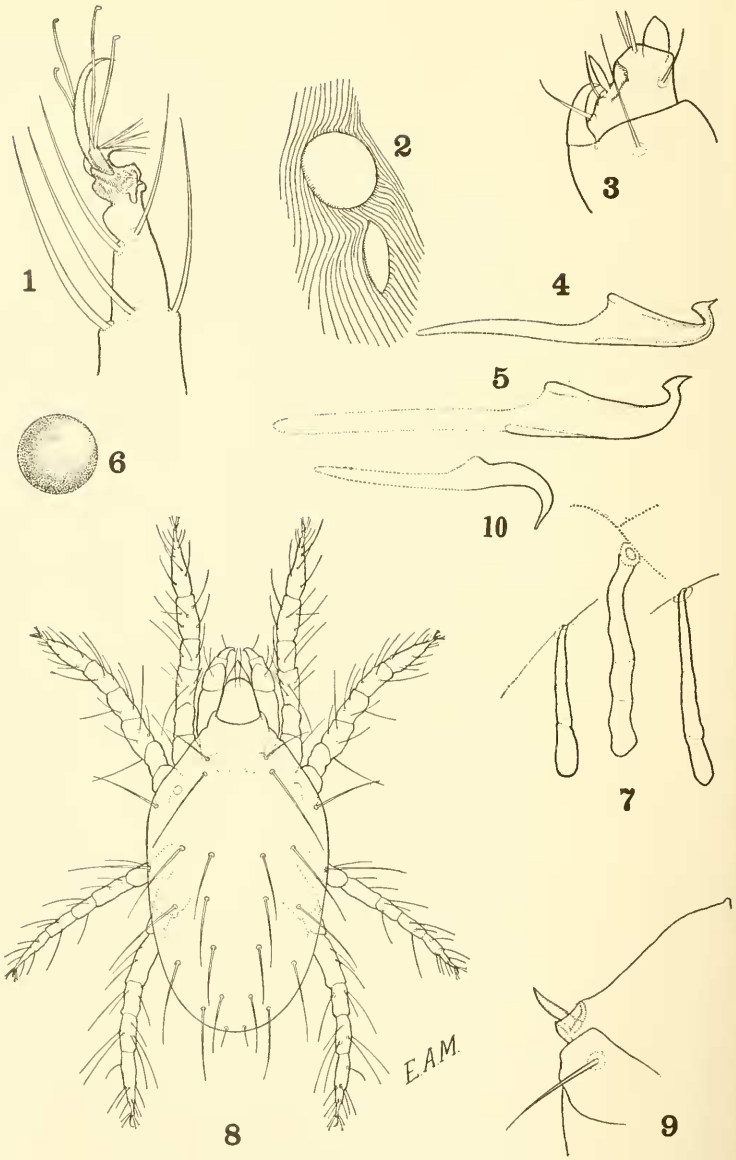
Paratetranychus simplex Banks.

Plate 29, Figures 1–9; Text Figures 1, 2.

Female.—General body color usually flesh to pale amber, with few olive-amber markings (more greenish when feeding on grasses). Frequently spots along margin of abdomen, which vary in color according to the nature of the food plant. One perfect and one imperfect eye cornea on each side, these deep carmine. Body oval, fully one and one-half times as long as broad, rounded behind, averaging 0.304 mm. in length and 0.187 mm. in width.[1] Almost no trace of suture between cephalothorax and abdomen. Twenty-six dorsal body setae, pale, not arising from tubercles. Forelegs pale salmon color; other legs flesh color. Mandibular plate somewhat narrowed anteriorly and rounded in front, with no emargination. Thumb of palpus one-third again as thick at base as axial length; terminal digit varying in length from one-third to one-half again its thickness at base (this structure being proportionately longer in immature individuals); on upper distal corner of thumb two pin-shaped digituli which are slightly longer than the terminal digit; fusiform dorsal sensilla situated at midpoint of thumb, slightly longer than terminal digit; thumb bearing three additional bristles, as usual. Foreleg about two-thirds length of body to front of cephalothorax, relative lengths of joints as follows: Coxa, 20; trochanter, 16; femur, 41; patella, 25; tibia, 27; tarsus, 41. Tip of tarsus bearing a single stout claw, curving more strongly toward its tip, bearing ventrally near its base a deflexed claw of the usual six subequal spurs; deflexed spurs slightly more than half as long as main claw. The usual series of four tenent hairs arising in pairs at sides of claw base. The collar trachea consisting of a rather short, nearly straight tube, which increases slightly in caliber toward its inner end. Egg spherical, without stalk, pale amber in color.

The eggs are deposited on the surface of the dates and among the fibrils of webbing which the females fabricate copiously. They are at first translucent-white to pale amber in color.

[1] Average measurements of a large series of individuals.



Paratetranychus simplex Banks and *P. viridis* Banks.

Figure 1, Tarsal appendages (viewed laterally).
2, Eye cornea.
3, Tip of palpus of female and its appendages (viewed laterally).
4 and 5, Penis (lateral view).
6, Egg.
7, Collar tracheae, showing individual variation.
8, Female (dorsal view).
9, Fleshy spur on upper surface of second joint of palpus of male.
10, Penis of *P. viridis* Banks.

Male.—Body smaller, narrower, and more wedge-shaped than in female; legs, especially the forelegs, proportionately longer than in female, and of salmon color. Palpal spur and supporting tubercle present as usual. Penis of general type of that of *Tetranychus bimaculatus;* inner lobe rodlike, somewhat longer than shaft; basilar lobe represented by an obtuse prominence; shaft fairly stout, but over twice as long as its basal thickness, tapering gradually backward and bent upward and forward slightly beyond the 90-degree angle; hook short, about one-fourth as long as shaft, expanding terminally to form the barb, which is less than one-fourth as long as the shaft; the barb bearing a blunt inner and a sharp outer point, the latter being somewhat upturned. Thumb of palups bearing a terminal digit that is twice as long as thick. Tarsal claw of foreleg differing from those of other three pairs of legs, as is usual with red spider males; the deflexed claw, instead of being split into six spurs, consisting apparently of a single simple claw which resembles and equals the main claw. Length of male, 0.224 mm.; width, 0.148 mm.[1]

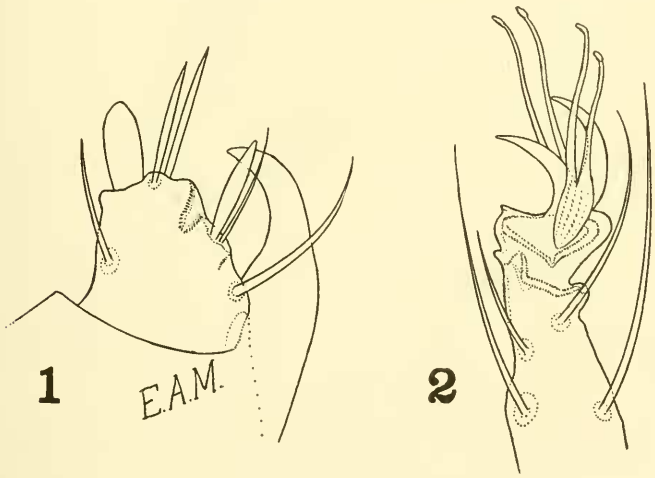


FIG. 2.

Paratetranychus simplex Banks.

1, Tip of palpus of male and its appendages (viewed laterally.

2, Tarsal appendages of leg I of male (lateral view).

A MITE CLOSELY ALLIED TO AND EASILY MISTAKEN FOR THE DATE MITE.

In the course of the study of mites on grasses and other monocotyledons, previously mentioned, a species came to the writer's attention which strongly resembles the date mite. In fact, these two species are so much alike that they can not be

[1] Average measurements of a large series of individuals.

distinguished with a hand lens. This mite, which occurs very commonly on grasses throughout southern California and Arizona, proved to be an undescribed species, for which we propose the common name "grass mite." It is herewith described.

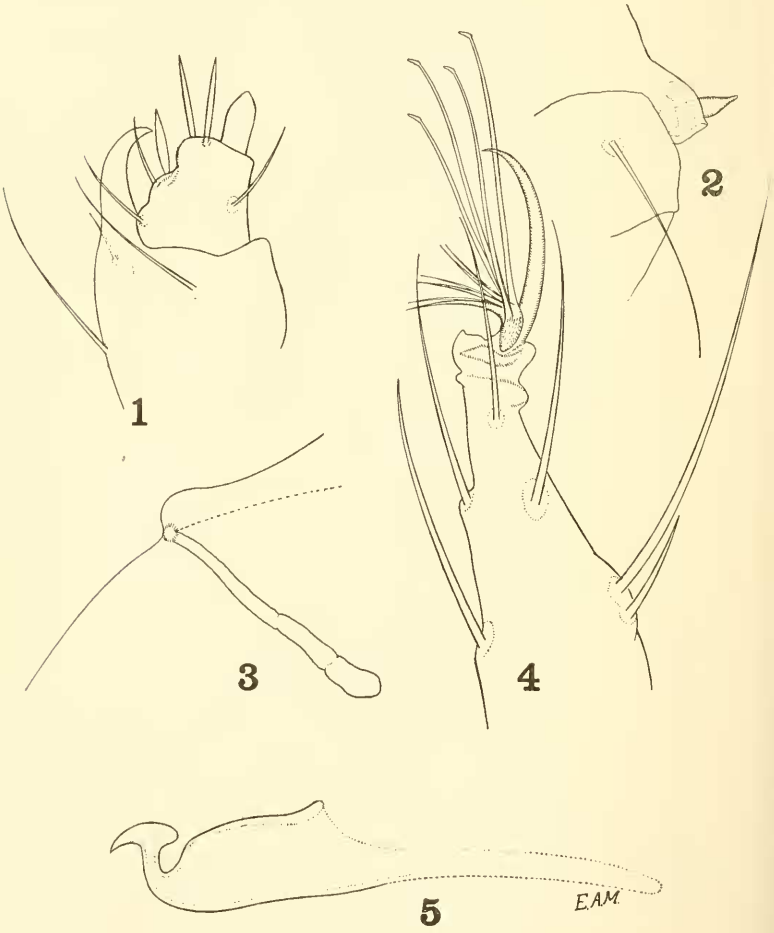


FIG. 3.

Paratetranychus stickneyi, new species.

1, Tip of palpus and its appendages (viewed laterally).
2, Fleshy spur on second joint of palpus of male (lateral view).
3, Collar trachea.
4, Tarsal appendages of female (lateral view).
5, Penis.

Paratetranychus stickneyi, new species.

Fig. 3, Figures 1–5.

Female.—Body outline and proportions similar to those of *P. simplex* Banks; color usually more greenish than in that species, and with abdominal spots blackish and more conspicuous. Twenty-six dorsal body setae, not arising from tubercles. Mandibular plate rounded anteriorly. Thumb of palpus in length equaling its thickness at base; upper distal angle of thumb removed from terminal finger by a distance equaling thickness of the latter, resulting in distal face of thumb being more than twice as thick as terminal finger; the latter only slightly, if at all, spatulate in profile; dorsal sensilla spindle-shaped, fully as long as terminal finger but more slender; other appendages of thumb arranged as usual. Tip of tarsus bearing a single stout claw which is provided ventrally, near its base, with a deflexed claw which is cleft to its base into six subequal spurs (tarsal appendages closely resembling those of *Paratetranychus simplex*). Collar trachea consisting of a rather short, nearly straight tube, which is expanded at inner end a little more abruptly than in *P. simplex*. Egg pale, nearly globular, but very slightly compressed dorsoventrally; without stalk.

Male.—Body much as in *Paratetranychus simplex*. Penis differing substantially from that of the latter; inner lobe rodlike, nearly twice as long as shaft; basilar lobe consisting of an obtuse prominence; shaft very stout, a little less than twice as long as its basal thickness, in profile with subparallel sides, narrowing very abruptly distally into the hook; hook one-third as long and one-fifth as thick as shaft, bent upward about 90° from axis of shaft, expanding terminally to form the very prominent barb, whose length is nearly half that of the shaft; posterior portion of barb produced into an acuminate, slightly downward-directed point; anterior portion of barb produced into an equally prominent rounded boss. Tarsal claw of foreleg closely resembling that of *P. simplex;* the ventral deflexed claw consisting of a single talon-shaped spur, resembling and equaling the main claw; the tarsal arrangement of legs II, III, and IV just as in the female.

Type slide.—Cat. No. 1236, U. S. N. M.

The type material is from Whittier, Calif., August 20, 1933, from Bermuda grass (*Cynodon dactylon*). This mite has been collected from 32 scattered localities in eight counties in southern California, as well as in Arizona. Most of these collections were from Bermuda grass, but this mite was also taken from various native and introduced grasses. The author has rarely failed to find this mite on Bermuda grass, and its occurrence on this plant is almost universal. The mite thrives best where the Bermuda grass is in a struggling condition through lack of moisture, and occurs only sparingly where the plants are in a thriving condition.[1] Although the date mite (*Paratetranychus simplex*) is found rather often on grasses, the grass mite (*P. stickneyi*) has never been found on species of date palms, even when infested grasses occurred nearby.

[1] This is true for several species of spinning mites.

The present species is probably closest to *Paratetranychus simplex* Banks. The two species may be distinguished as follows:

Paratetranchyus simplex Banks.—General body color of female usually flesh to pale amber; spots, if any, usually inconspicuous. Thumb of palpus in female one-third again as thick at base as axial length; terminal finger two-thirds as thick as tip of thumb. Penis with shaft twice as long as its basal thickness, tapering gradually backward, and bent upward and forward a little beyond 90°; hook short, about one-fourth as long as shaft; barb less than one-fourth as long (tip to tip) as shaft, the outer point being directed somewhat upward.

Paratetranychus stickneyi McGregor.—General body color of female usually greenish amber; abdominal spots usually blackish. Thumb of palpus in female with basal thickness not greater than its axial length; terminal face of thumb over twice as thick as terminal finger. Penis with shaft very stout, less than twice as long as its basal thickness; sides of shaft subparallel, narrowing very abruptly distally; hook bent upward about 90° from its axis; hook relatively long, about one-third as long as shaft; barb strongly developed, nearly one-half as long (tip to tip) as shaft, the outer point being directed slightly downward.

THE OLD WORLD DATE MITE.

In 1932 André[1] pointed out that the mite of dates in Algeria differed significantly from *Paratetranychus heteronychus* Ewing, especially in the tarsal arrangement of leg I of the male and in the male genital structure. André concluded, from his review of the American literature, that the Algerian date mite is probably *P. simplex* Banks.

Dr. Stickney and the writer were anxious to compare the date mite of America with the mite attacking dates in Africa and Asia. They were fortunate in obtaining specimens collected on dates at Basrah, Iraq[2] and at Biskra, Algeria.[3] These date mites were studied critically by the writer in an attempt to determine the origin of the mite attacking dates in the United States. As a result of this study the conclusion has been reached that the mites from Iraq and Algeria are identical. In the details of the male genitalia and the tarsal appendages of Leg I of the male the Asio-African mite differs from *Paratetranychus heteronychus* (as described by Ewing), and from its synonym, *P. simplex*, as revealed through the present studies. In the above and other details the date mite of Iraq and Algeria is divergent from other known species, and it seems advisable, therefore, to describe the species as new to science, as follows:

[1] Bull. Soc. Hist. Nat. Afrique Nord, vol. 23, 1932, p. 301.

[2] Collected and sent by V. H. W. Dowson, of the Hills Brothers Eastern Company.

[3] Supplied through the courtesy of M. Delassus, Chef du Service de l'Inspection de la Defénse des Cultures l'Algerie.

Paratetranychus afrasiaticus, new species.

Fig. 4, 1–4.

Female.—Body 0.293 mm. long (to tip of mandibular plate) by 0.182 mm. wide (as received). Preserved specimens pale in color (described as yellowish to greenish by other workers). Twenty-six dorsal abdominal setae (including pair at posterior end), not arising from tubercles. Mandibular plate about twice as long as wide; rounded anteriorly, without emargination. Relative length of joints of foreleg: Coxa, 20; trochanter, 19; femur, 45; patella, 31; tibia, 28; tarsus, 46. Terminal finger of palpus fairly ample, in profile with subparallel sides, bluntly rounded at end, not much longer than thick; dorsal sensilla spindle-shaped, narrower than but as long as terminal finger. Arrangement of tarsal claw similar to that of *Paratetranychus simplex*, except that the ventral spurs about equal the main claw in length.

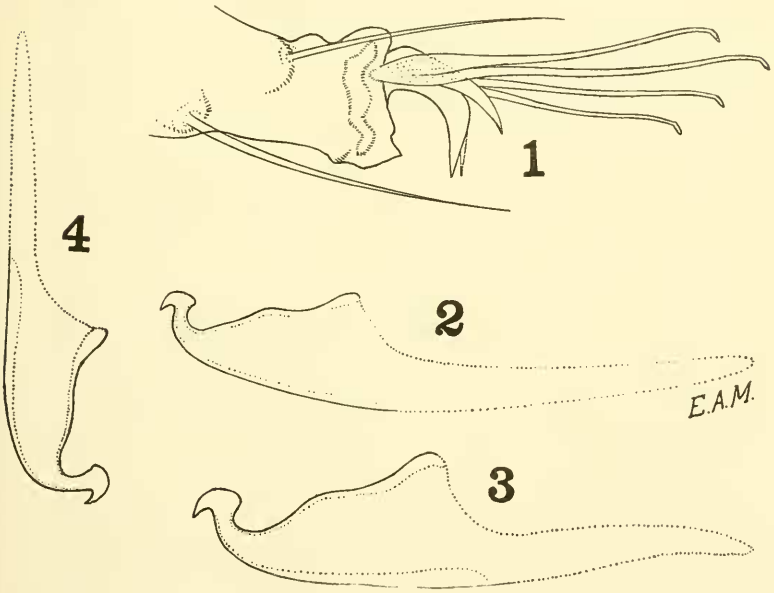


Fig. 4.

Paratetranychus afrasiaticus, new species.

1, Tip of tarsus of foreleg of male, showing structure of claw (lateral view).

2, 3, and 4, Three drawings of penis.

(1, 2, and 3 are from specimens collected in Iraq; 4 is from material collected in Algeria.)

Male.—Body 0.234 mm. long (to tip of mandibular plate), 0.267 mm. to tip of palpi. Tarsal appendages of legs II, III, and IV similar in arrangement to those of female; tarsal claw of leg I consisting of the simple main claw, which is

only slightly curved, and the usual ventral deflexed member, which is noticeably stouter and a little longer and more curved than the main claw; this ventral deflexed claw appears simple when viewed in exact profile, but actually is cleft almost to its middle into either two or four spurs (light refraction makes this point difficult to determine.) Penis with inner lobe apparently rodlike; shaft very thick, its greatest thickness from two-thirds to three-fourths its length, narrowing rather abruptly posteriorly, with a pronounced convexity at upper midpoint of shaft; hook deflexed upward almost 90 degrees from axis of shaft, and terminating in a clearly developed barb, the antero-posterior length of which is only about one-fifth that of the shaft; barb with a proximal, inconspicuous, rounded boss and a distal, acute point that is directed noticeably downward.

Type slide.—Cat. No. 1298, U. S. N. M.

The type material is from Biskra, Algeria, June 25, 1937, from dates, collected through the courtesy of M. Delassus.

The Old World date mite is perhaps closest to *Paratetranychus simplex* Banks. The two species may be distinguished as follows:

Paratetranychus simplex Banks.—General body color of female pale amber to flesh color. Tarsal claw of leg I of male with ventral deflexed member resembling and equaling the main claw, and apparently unsplit. Penis with shaft over twice as long as its basal thickness, and with no noticeable convexity at upper midpoint; barb of penis with blunt inner and sharp outer point, the latter upturned.

Paratetranychus afrasiaticus McGregor. General body color of female yellowish green. Main tarsal claw of leg I of male very little curved, with ventral deflexed member which is noticeably stouter and a little longer than the main claw; ventral member divided almost to its middle. Shaft of penis only about one-fourth to one-third again as long as its basal thickness, and with a strong convexity on its upper surface. Barb of penis with sharp outer point that is directed downward.

The importance of the date mite as a pest of growing dates in Iraq was noted by both Buxton[1] and Ramachandra.[2] The bunches of green dates become enshrouded in webbing spun by the mites, and the resulting effect, or disease, is called "toz." Ramachandra describes the Iraq mite as "greenish yellow," whereas the American species, when feeding on dates, is hardly at all greenish. This acarid occurs throughout Iraq and is considered the worst date pest in that country. This mite is also one of the major pests of dates in Algeria, according to Delassus and Pasquier[3] and André.[4]

[1] Bull. Ent. Research, vol. 11, 1920.

[2] Mesopotamia Dept. Agr. Mem., 6, 21 pp.

[3] Semaine du Dattier, Biskra, Novembre, 1931.

[4] See footnote 1, page 254.